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REMARKS

Claims 1-31 and 33-42 are pending in the application. Claims 1-19, 24, 26-31 and 39-42 have been previously withdrawn from consideration. Claims 20-23, 25 and 33-38 stand rejected to by the Examiner. The drawings have been accepted by the Office. The Examiner's objections and rejections are addressed below in substantially the same order as in the office action.

Election/Restrictions

Claims 1-14, 18, 19, 24, 26-31 have been withdrawn from further consideration by the applicant's as being drawn to non-elected inventions and/or species. Claims 15-17 and 39-42 are withdrawn by the Examiner from further consideration pursuant to 37 CFR 1.142(b) as being drawn to the non-elected group I invention, there being no allowable generic or linking claim.

CLAIM REJECTIONS UNDER 35 U.S.C. 112

Claims 36-38 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant has revised claims 36-38 to recite a device capable of performing functions rather than performing the functions *per se*.

CLAIM REJECTIONS UNDER 35 U.S.C. 103

Claims 20-23 , 25 and 33-38 stand rejected under 35 U.S.C. as being unpatentable over Powell (US 6786157) in view of Liu (US 2003/0037692 A1). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined)

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must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP 2143.

In this instance, the prior art clearly does not have a suggestion or motivation to combine. Section 2143.01 of the MPEP defines two cases that preclude a finding of a suggestion to combine: (i) a modification that renders a device unsatisfactory for its intended purpose, and (ii) a modification that would change the principle of operation. For the reasons presented below, the Examiner's proposed modification falls within these two cases.

1. ***MPEP 2143.01 (v) If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)***

The Examiner contends that "enhanced penetrative properties" would motivate one skilled in the art to combine a metal cap layer with the Powell liner. Providing the Powell liner with "enhanced penetrative properties," however, would make the Powell device unsatisfactory for its intended purpose. The Powell device is used for avalanche control. Powell explains that deep penetration can be counter-productive:

Fuzes in older military ammunition are designed to detonate upon impact, in soft snow, however, these fuzes tend to trigger well below the surface and quite probably not until the projectile strikes rock or firm ground. In fact, the ideal point of burst for avalanche release is several meters above the surface in proximity mode. However, with gun fired projectiles, this can only be achieved with an electronic proximity burst fuze. Since this type of fuze is both inhibitive expensive and notoriously unreliable against light, dispersed media such as snow, the performance of impact fuzing continues to be tolerated. (Col. 1, lines 65-67, Col. 2, lines 1-8)(emphasis added)

Increasing the penetration of the Powell liner increases the risk that the charge will “strike rock or firm ground” and decrease the possibility that the charge will donate proximate to the surface. Both of these outcomes are described as undesirable.

Furthermore, Powell expressly distinguishes high penetration shells from the disclosed invention. Powell states that firing artillery shells into snow has been done previously. Thereafter, Powell explains that such prior art, which is designed for “high penetration into steel,” is distinguished from his device because of the prior art’s inability to “dissipate” energy.

It is acknowledged that various types of anti-tank ammunition, bearing shaped charge liners, have been fired into avalanche start zones in the past but this has been as a result of ammunition availability rather than an interest in the shaped charge effect. Results from this type of ordnance, designed specifically for high penetration into steel, has nevertheless been no different from standard artillery fragmenting shells because little of the jet energy can be dissipated into the snow pack. (Col. 2, lines 22-30)(emphasis added)

Thus, additionally, adding a “high penetration” metal cap to the Powell liner would make the Powell device more resemble the prior art over which Powell seeks to improve. Furthermore, Applicant directs the Examiner’s attention to Powell’s use of PERSPEC ® for the liner material, which is PLEXI-GAS, a relatively soft material.

Thus, the Powell itself has ample discussions that expressly state that “enhanced penetrative properties” is not desirable. Accordingly, one skilled in the art would not combine the metal cap with the Powell liner because the Powell device would be rendered unsatisfactory for its intended purpose.

2. ***MPEP 2143.01 VI. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)***

The principles of operation of the Powell Device and the Liu Device are distinct and incompatible. Modifying the Powell Device with the metal cap of the Liu Device would clearly change the principle of operation of the Powell Device.

The key operational principle of the Powell Device is the dispersion of energy using particulate material:

Accordingly, the present invention provides a hollow charge explosive device including an explosive charge defining boundary walls of a cavity and including particulate material located forward of said boundary walls so as to be dispersible by said explosive charge when detonated. (Col. 2, lines 34-38)

The particulate material, if present in a liner, is driven in the same way as that of a conventional shaped charge liner. However, in this case, the particulate medium forms into a highly energetic non-cohesive stream of particles, generally wider than that produced by a conventionally lined shaped charge. In this highly energised state, the low bulk density of the liner material and high surface area attributable to each particle of the liner material, together with the larger surface area of the jets cross section, facilitates an intimate and violent kinetically stimulated reaction with the target medium. Given a knowledge of the intended target material and its constitution, eg a snow slab, the liner material can be chosen to optimise the blast energy yield over and above that normally attributable to the explosive charge alone. (Col. 2, lines 42-55)(emphasis added)

Furthermore, Powell describes the advantages of his invention with respect to the volume of snow removed, not the depth of the crater created by the charge. In particular, Powell explains that significantly greater volume of the craters in Figures 4 and 5 as compared with Figure 3. Powell does not in any way suggest that the depth of penetration would improve the operation of the device. In fact, Figures 6-9 suggest quite the contrary. Powell shows all four embodiments either above or at the surface of the snow. The principle behind the Powell device is based on a wide-dispersion near surface detonation, which is contrary to the deep penetration features of Liu. The teachings of the references are not sufficient to render the claims prima facie

obvious because the Examiner's proposed modification or combination of Powell and Liu would change the principle of operation of the both references.

Other Discussion in Powell that Teaches Away from the Combination

Applicant further observes that the applications Powell suggests for the present teaching do not utilize enhanced penetration:

Although the use of present invention has been described in terms of avalanche control applications, the benefits of controlled and highly directional cutting, perforation or stimulation of secondary reactions of explosive devices according to the present invention has a wide range of other potential applications. These include:

rapid generation of wide access holes in concrete/rock walls in support of rescue and recovery operations, where a range of liner materials and particle sizes for the liner can be chosen to control the nature of the cut and/or residual particle penetration into sensitive areas behind;

the use of directing the highly focused blast effects to combat and extinguishing burning oil wells;

rapid internal cutting of narrow bore, thick walled pipes, typical of well liners and drilling shafts; and

spalling of loose rock from chamber roofs in underground mines, civil tunnelling and mining operations and underwater engineering operations. (Col. 8, Lines 13-30)(emphasis added).

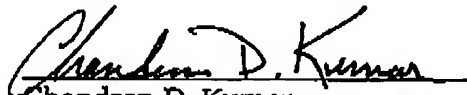
"Enhanced penetration" plays no role, to Applicant's knowledge, in any of the above applications. Rather, each of the above applications involve surface or near surface activity. Applicant further observes that Powell specifically states that his device is for "cutting" well liners and drilling shafts—not perforating well liners. Indeed, as one skilled in the art would appreciate, a perforating activities that cuts a well liner is highly undesirable since the overall wellbore structure can be weakened and compromised.

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For all the foregoing reasons, Applicant submits that the application is in a condition for allowance and such action is requested. The Commissioner is authorized to charge any fees deemed necessary or credit any overpayment related to the filing of this Response to Deposit Account No. 13-0010 (COR-1075-US).

Respectfully submitted,

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